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The Early History of Felt

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THE EARLY HISTORY OF FELT

By BERTHOLD LAUFER

THE art of making felt by rolling, beating, and pressing animal hair or flocks of wool into a compact mass of even consistency is assuredly older than the art of spinning and weaving. In point of time, felted stuffs followed immediately, or originated contemporaneously with, the custom of using animal skins or furs as garments. Felting was practised in times of great antiquity both in Asia and Europe, but it was restricted to these two continents. It is noteworthy that it has always been absent in Africa. Even in ancient Egypt where sheep were reared and their wool woven into cloth felt was unknown. It did not exist either in aboriginal America. The ancient Peruvians, although they had domesticated the llama and alpaca, did not conceive the notion of felt.

There are ancient records extant that give references to felt in Chinese, Greek, and Latin literatures. We must not imagine, however, that for this reason the Chinese, Greeks, and Romans were the first nations to have made use of felt. The Greeks lived in proximity to the roving Scythians of southern Russia; and the vast steppes stretching east of the Ural and the Caspian sea across Russian and Chinese Turkestan into southern Siberia and Mongolia were, from earliest times, the playground of ever moving tribes, restless like the waves of the oceans, of Iranian, Turkish, Mongol, and Tungusian nationalities. These tribesmen of nomadic habits subsisted on the wealth of their flocks consisting of cattle, camels, sheep, goats, and horses. The making of felt naturally presupposes the existence of wool-furnishing domestic animals like sheep, goat, and camel. While it is true that felt can be made and has been made from the hair of wild animals, the supply of such hair is not plentiful enough to establish the industry on a large scale. It is therefore clear that solely peoples who possess a large stock of herds of wool-bearing sheep and camels could call into life

a flourishing felt industry. This reason alone, however, would hardly be sufficient to ascribe the invention of felt to the nomadic population of Asia and to disclaim it for the Chinese and the Greeks; the two latter nations also had domesticated sheep, and the Greeks manufactured sheep-wool into garments. The ancient Chinese, although they had sheep, never utilized its wool for clothing. The Chinese, as well as the Greeks and Romans, assuredly understood the preparation of felt, and the Chinese still prepare it, but the manufacture of this article had a limited importance among them. Eliminate felt from Chinese, Greek, and Roman civilizations, and they would still remain what they are, not being in the least affected by this minus. Eliminate the same element from the life of the nomadic populations, and they would cease to exist, they would never have come into existence. With these peoples felt is a fundamental of culture, an absolutely essential feature and necessity of life, while with the highly civilized nations like the Chinese, Indians, Greeks, and Romans it is a side issue, an incident, an element of occasional and minor importance.

The use of felt, therefore, has reached its maximum intensity and its climax among the nomadic tribes of Asia, and this is the principal reason why we are compelled to attribute the invention of felt, both the initiative and the perfection of the process, to the Asiatic nomads. This means, of course, that the Chinese, the Indians, and the Greeks learned the art from the latter, while the Romans adopted matter and word from their masters, the Greeks. Another interesting point of difference is that to the civilized nations felt was simply a utilitarian product which they adopted because it was useful and practical, whereas among the nomads it was associated with religious and ceremonial practices. It was part and parcel of their life, inseparable from their inward thoughts. Which of the many hundreds of tribes of inner Asia was the original inventor of felt, it is impossible to ferret out in the present state of our knowledge. The beginnings of the art are lost in the dawn of human civilization. Neither the ancient Scythian nor the ancient Turkish tribes had any system of writing so that no records of their earliest history are preserved in their own languages; for all that we know about them we are indebted to the records of the Chinese and the Greeks. Archaeology, to some extent, comes to our rescue, for some ancient remains of felt have been discovered in Central Asia. More than that, the ancient mode of life of the Turkish, Mongol, and Tibetan tribes is still preserved in full vigor: they still manufacture felt as their ancestors did thousands of years ago, they still utilize it for exactly the same purposes. By combining historical, ethnological, and archaeological methods the ear-

ly history of felt can be reconstructed with a fair degree of accuracy and completeness.

In the light of the preceding remarks it is clear that no credence can be attached to the European legend according to which the invention of felt is ascribed to Saint Clement, who while on a pilgrimage placed carded wool in his shoes to protect his feet, the constant pressure and moisture changing this wool into felt.

No detail of the early process of felting is preserved by any Chinese or Greek author, but there can be no doubt that in principle the ancient process was identical with that prevailing in Asia at the present time. This primitive process is practically the same everywhere. The principal instrument used is a large mat. The wool is spread out on this mat layer upon layer until the desired thickness is secured, the wool for the upper layers being generally of a better quality or finer texture than that in the interior and lower layers. Grease or oil mixed in water serves as size. The mat is rolled up under firm pressure with the feet (some people use the back of the forearm in this process), then it is unrolled and rerolled from the opposite end. This manipulation of rolling forward and backward occupies a considerable time; revolving is continued for four or five hours, when the fibers become firmly and closely intertwined. The felt is now taken up, washed with soap and water, dried, and again stretched on the mat and dried in the sun. Colored patches of felt or wool are arranged on it in India and Turkestan, and the whole is then again subjected to the rolling process for several hours, when the material is completed and fit for use. In India the finer kinds of felt are trimmed with a mowing-knife, which greatly improves the appearance and brings out the distinctness of the colors.

FELT IN CHINA

In the earliest documents of the Chinese, the Book of Songs (*Shi king*) and the Book of History (*Shu king*) no mention is made of felt. It appears in Chinese records toward the end of the Chou dynasty (fourth to third century B.C.), and felt rugs seem to have been used at that time as mattresses to sleep upon. At the outset it is improbable that the Chinese could be regarded as the inventors of felt. They raised sheep, but never utilized their wool for any fabrics. Hemp and other fibrous plants, as well as silk, furnished the staple for clothing. Woolen materials have always been alien to Chinese civilization. There was no cattle-breeding on a large scale, and consumption of milk and any dairy products was unknown. The Chinese were (and still are) essentially a nation of agriculturists. From early times, the north of China was in close contact with central and northern Asia teeming

with a vast pastoral population, for the greater part of Turkish and Tungusian nationality. These ever restless hordes perpetually poured over the Chinese frontiers and raided and pillaged the villages of the farmers. The most dreaded of these predatory foes were the Hiung-nu, as they are styled in the Chinese annals, who have been identified with the Huns. From about 1400 B.C. the Chinese were constantly engaged with them in a life and death struggle. The Chinese armies in the beginning were usually the losers as they opposed their infantry to the mobile cavalry and mounted archers of their enemies. The Hiung-nu, a Turkish tribe, subsisted on cattle, fed upon flesh and milk, and used leather obtained from the skins of their domestic animals as clothing and armor; in addition to leather garments they wore coats or overcoats of felt and lived in tents covered with the same material. It is very probable that the Chinese made their first acquaintance with felt during their long military and diplomatic intercourse with the Hiung-nu which lasted for many centuries. In 307 B.C. Wu-ling, king of the principality Chao, adopted the clothing and the tactics of shooting with the bow on horseback from the nomadic tribes. Chinese garments were spacious, loose, and flowing, and a serious obstacle to riding and shooting, while the costume of the nomads was tight-fitting and equipped with tall boots. There is no doubt that on the occasion of this reform movement in dress also articles of felt and perhaps the manufacture of felt itself were adopted by the Chinese. The country inhabited by the nomads is known to them under the name "the land of felt."

Under the Han dynasty (201 B.C.-A.D. 220) felt was well established in China and used in the form of mats. The Emperor Wen (179-152 B.C.) of this dynasty wore a felt cap on his hunting expeditions. The felt of the nomads is alluded to by the philosopher Huai-nan-tse, who lived in the second century B.C.; his statement implies that in his time felt was still unknown south of the Yangtse region.

At the end of the third century A.D. the use of felt was still regarded as something foreign and barbaric, for it is on record that in the period T'ai-k'ang (A.D. 280-290) when fillets and girdles of felt were introduced as a novel fashion, the people ridiculed this custom and said, "China apparently has been conquered by the nomads (Hu), for felt is a product of the nomads, and now with felt fillets and girdles we adopt their styles."

In A.D. 532 Yüan Siu was placed upon the throne as tenth emperor of the Northern Wei dynasty by Kao Huan, who sent four hundred horsemen to meet him. The future emperor betook himself into a felt tent to don imperial regalia. He was then escorted to the east gate of the palace, and according to an ancient custom of the Toba, one of the northern nomad tribes

from which the Wei dynasty issued, he was lifted by seven men on a piece of black felt; and while seated on it, he bowed toward the west, imploring Heaven. This was an old usage of the nomads of central Asia, and we shall encounter it again among Turks and Mongols.

A certain Liu Ling-ch'u, who lived in the fifth century A.D., is said to have cut human figures out of felt for magical purposes. This idea was doubtless borrowed from the nomads, for it was an ancient Turkish and Mongol custom, more of which will be said below, to fashion religious images from felt and to keep them in leather cases.

A felt cap is referred to in the *Ts'an luan lu*, a diary kept by Fan Ch'eng-ta during his journey from the capital to Kwei-lin in Kwang-si, on his appointment to that prefecture in A.D. 1172.

Not only in the north, but also in the west and southwest were the Chinese surrounded by felt-using nations. The vast area occupied at present by the provinces of Se-ch'wan and Yün-nan was anciently populated by many different aboriginal groups of tribes partially related to the Tibetans, partially to the Siamese (Tai family), and partially of independent stock, prior to the advent of the Chinese. The latter, in the course of several centuries, penetrated those regions, subdued the very warlike aborigines, and colonized the country. Many of the tribes were annihilated, others were pushed back into inhospitable high mountains, still others migrated into Siam and Burma, others survive to this day. The earliest reference to felt in this territory is made in the Annals of the Han Dynasty with reference to a tribe inhabiting Se-ch'wan, called the Jan-mang, who were essentially sheep-breeders and manufactured felt as well as various kinds of woolen stoffs; the Chinese annalist records as a remarkable fact that they understood the art of treating the diseases of sheep.

The present province of Yün-nan was formerly occupied by the powerful kingdom of Nan-chao from which at a later date the present-day Siamese issued. The men of the Nan-chao tribes of Yün-nan wore one-piece blankets of felt in the ninth century (according to the *Man shu*, written by Fan Ch'o about A.D. 860). The same author also relates the curious fact that many men in the country P'iao wore white felt. Now P'iao was situated 75 days' journey south of Yung-ch'ang in Yün-nan and corresponds to Pyü, name of the prominent tribe at Prome, the ancient capital of Burma. Whether felt was at that time manufactured in Burma is not known; it seems more likely that it was imported there from Yün-nan.

An important document bearing on felt is contained in the *Ling wai tai ta*, written by Chou K'ü-fei in A.D. 1148 (ch. 6, p. 12). This work gives a geographical description of the two southern provinces, Kwang-tung and

Kwang-si, as well as many valuable notes on the ethnography of the native inhabitants, their customs, products, and manufactures. The author emphasizes the wealth of sheep in the land of the Southwestern Man as they are called by the Chinese, and says that they produce felt and woolen cloth in great quantity.

From their chieftains downward to the lowest man there is not one who would not throw over his shoulders a piece of felt. The sole difference between the two classes is that the chieftains wear an embroidered shirt on their skin and don the felt over it, while the common people wear the felt directly over their skin. The felt of northern China is thick and solid; in the south felt pieces are made to a length of over thirty feet and to a width of from sixteen to seventeen feet. These are doubled along their width, and the two ends are sewed together, so that they are from eight to nine feet wide. They take a piece of felt lengthwise and wrap it around their body, fastening it with a belt around their loins. The women follow the same practice. During the daytime they are thus wrapped up; at night they sleep in their felt blankets; whether it rains or the sun shines, whether it is cold or warm, these are never separated from their bodies. In their upper part these blankets are decorated with designs like walnuts. Those which are long and big and yet light in weight are held in the highest esteem, and those manufactured in the country of Ta-li (in Yün-nan) are regarded the best.

What this Chinese author noted some eight hundred years ago still holds good for the majority of aboriginal tribes in Yün-nan and southern China. Most of these, particularly the Lolo and Moso, still wear a blanket or a sort of sleeveless coat made of a single piece of white felt as a protection against chill and rain both in winter and summer. Many authors relate with amazement that they never part with this outfit, even in intensely hot weather.

In 1863 S. Wells Williams (*The Chinese Commercial Guide*, 5th ed., Hong-kong, 1863, p. 119) wrote,

Felt caps are worn by the poor throughout the whole country. They are of various shapes and different degrees of fineness; some are made hollow so that when pulled out, they resemble a double cone. The felt cuttings are collected from the manufacture of druggets, caps, soles of shoes, and leggings, to be boiled down and felted over again.

Felt is still manufactured in China into caps, rain-hats, coats, stockings, shoes, shoe-soles, tablecloths, rugs, and carpet-bags. In Suchow the industry is still very much alive. Boys are fond of felt caps, especially when trimmed with colored silk and provided with ear-muffs of fur. The fishermen on the Great Lake (T'ai Hu) wear large, broad-brimmed felt hats plain or trimmed with black satin (specimens collected by me in Field Museum, Chicago).

The method employed by the Chinese in preparing felt is the same as that used by the Tibetans, Mongols, and Turks, with a single exception: the first step they take is to loosen the wool by means of a large bow by tightening the string and jerking it off in rapid motion. This process is derived from that of treating cotton, and the bow in either case is identical. The layers of wool are heaped up on a bamboo mat and carefully moistened with water sprayed from the mouth in the same manner as our Chinese laundry-men moisten linen. Then the wool is rolled up in the mat which is rolled to and fro, and pressed by means of the feet.

FELT IN TIBET

In ancient times felt and hide formed the common material for the clothing of the Tibetans, according to the Chinese Annals of the T'ang Dynasty (A.D. 618-906). Felt was also used in Tibet for plates. Even the kings of Tibet were clad in garments of felt; when Srong-btsan sgam-po, the first king of Tibet known in history, married a Chinese princess in A.D. 641, he adopted, in order to please his refined consort, the cultured manners and customs of China and discarded his felt and fur robes which had to give way to Chinese silk and brocade. The Chinese Annals inform us also that the men of rank in Tibet lived in large felt tents called *fu-lu* (Tibetan *sbra*); this kind of tent served for military purposes, and there were big ones capable of holding several hundred men; they formed a military camp. The pastoral population of Eastern Tibet, however, has always lived in square tents covered with a black cloth densely woven from yak-hair. In this respect and in its quadrangular shape the Tibetan tent contrasts with the Mongol circular felt tents and represents a dwelling-type of its own. This tent of yak-hair stuff goes back to a venerable age, for it is referred to as early as the sixth century in the Annals of the Sui Dynasty with reference to the Tang-hiang (Tangut), a Tibetan tribe living in the vicinity of the Kukunor. The same people, however, as emphasized by the Chinese annalist, held felt in highest esteem and looked upon it as the finest ornament.

In central Tibet all men, even the Dalai Lama, wear a high-crowned, red-fringed felt hat; the women wear a red felt hat in the summer. The felt made by them is praised by a Chinese author of the eighteenth century; it is also worked up, he adds, into boots. In fact, the women of Tibet mostly wear high felt boots. These are of the same shape as the leather boots usually worn by men and reaching up to the knees. These felt boots are trimmed with colored patches, the lower part white, then red and green. Like the leather boots they are lined with woolen cloth, while the soles are always of

leather. The Tibetan boot is devoid of a heel. The Tibetan nomads wear high conical felt hats with a large brim turned downward.

The most interesting object made of felt by the Tibetans is a poncho which consists of a long rectangular strip of felt with a hole in the center to put the head through, and which is used on horseback in rainy weather. Most Tibetans spend the whole day in the saddle. When traveling in Tibet for more than a year, I always carried such a felt poncho with me and found it immensely useful; it was a perfectly safe protection in the most violent rain and snowstorms and completely envelops the horse as well as the rider. Similar rain ponchos are used in Asia Minor.

W. W. Rockhill describes the production of felt in Tibet as follows:

Its mode of manufacture is extremely simple. The wool, having been first picked over, is spread out a handful at a time on a large piece of felt on the ground, each handful overlapping the preceding one in such a way that a piece of uniform thickness and of whatever size is desired is made. This is rolled up tightly and with much pounding of the closed fist and then unrolled, and this work is kept up for an hour or more; then the roll is soaked in water and the work of rolling, unrolling, kneading, and beating with the closed fist goes on for another hour or two. I was told that a piece of felt had to be kneaded at least 1,000 times before it was ready for use. After the roll has been left to dry for a while it is opened, and by pulling it slightly in different directions the surface is made smooth, and the edges are trimmed with a knife. Sometimes it is bleached. Altogether, Tibetan and Mongol felt is vastly inferior to that made by the Chinese.

FELT IN INDIA

Felt appears to have been known in India in ancient times. Nearchus, who accompanied Alexander the Great on his expedition to India and as admiral of his fleet in 325 B.C. discovered a sea route between the Indus and the Euphrates, reports that the inhabitants of India understood the art of felting wool (Strabo XV. 1, 67). It is on record in the Chinese Annals of the T'ang Dynasty that in the beginning of the period T'ien-pao (A. D. 742-756) tribute gifts were dispatched to the imperial court by the king of the island of Ceylon, and among these presents pieces of white felt figured conspicuously. In this connection it is worthy of mention also that according to an old Chinese account of Java two kinds of felt were obtainable on the island—one dyed a color like granite and another dyed a deep crimson.

John Fryer, who traveled in India and Persia from 1672 to 1681, writes that at Surat the horses were covered warmly with a kind of felt or flock-work, two or three double. Both woven and felted blankets (*kambala*) were made in northern India.

In India felt is at present manufactured in Ladak, Jeypore, Rajputana, Hyderabad and other places, felts being used for blankets, carpets, cushions, bedding, cloaks, and leggings. Colored wool is often used with great effect in producing patterns on the surface of the material. The best sort of felt consists entirely of sheep's wool, or is a mixture of wool with goat's and camel's hair picked and cleaned.

FELT AMONG IRANIANS AND TURKS

The Chinese Buddhist pilgrim Fa Hien started in A.D. 399 on his memorable long journey to India overland from China by way of Central Asia, of which he has left a fascinating account. Passing through the kingdom of Shen-shen south of and not far from Lake Lob (Lob-nor), he made this entry in his diary:

The clothes of the common people are coarse, and like those worn in our land of Han (China), some wearing felt and others coarse serge or cloth of hair; this was the only difference seen among them.

This is the earliest account of the use of felt in a region of what is now Chinese Turkestan. Turkestan means "land of the Turks." At the time of Fa Hien's visit, however, Turkestan was not yet conquered by Turks, who were then confined to southern Mongolia, but was densely populated by Iranian tribes, members of the Indo-European family, who had a highly flourishing civilization. The Iranian stock at that time covered an immense territory, stretching from the confines of China on the west through the plains of Chinese and Russian Turkestan far into the steppes of southern Russia; for the Scythians so called by the Greek historians are members of the same group, and all of them are close relatives of the Persians. All the tribes belonging to this great Iranian family were active and energetic producers of felt, and it may even very well be the case that they were the initiators of the technique. Certain it is that woven rugs and carpets were first produced in their midst, and as in my estimation carpet-weaving sprang up after and as a consequence of felted rugs, it stands to reason that it was Iranians who invented the manufacture of felt.

Herodotus (IV, 46) describes the Scythians as living on carts which were the only houses they possessed. Rawlinson comments justly that their wagons carried a tent consisting of a light framework of wood covered with felt or matting, which could be readily transferred from the wheels to the ground. Hesiod, the Greek poet, says that Phineus was carried by the Harpies "to the land of the milk-fed nations whose houses are wagons." Aeschylus (Fettered Prometheus 709) sings of the "wandering Scyths who dwell in

latticed huts high-poised on easy wheels." The Scythians also were in the constant habit of wearing felt caps or hats.

The fact of an Iranian felt industry is signally confirmed by the combined testimony of Chinese and Greek observers. Fa Hien has just been called to the witness-stand. According to the Chinese Annals of the T'ang Dynasty, the king of Sogdiana, who resided at Samarkand, was in the habit of wearing a felt hat adorned with gold and precious stones.

The Persian Magi, the priests of Zoroaster, wore high turbans of felt, reaching down on each side so as to cover the lips and sides of the cheeks (Strabo XV. 3, 15). The Lycians who accompanied Xerxes, king of Persia, on his expedition to Greece, were clothed with felt caps surrounded by plumes (Herodotus VII, 92). The Persian soldiers in Xerxes' army wore light and flexible caps of felt which were called tiaras. The Medes and Bactrians were equipped with the same kind of headgear as the Persians. The Armenians were also styled "wearers of felt." Strabo characterizes the Persian cap as "a felt in the shape of a tower," adding that these caps were necessary in Media on account of the cold climate. The king of Persia was distinguished by a stiff felt hat which stood erect, whereas his subjects wore their tiaras folded and bent forward (Xenophon, *Anabasis* II. 5, 23). Hence in *The Birds* of Aristophanes, the father of comedy, the cock is ludicrously compared to the Great King, his erect comb being called his "Persian cap" (*kyrbasia*). The Athenians no doubt considered this form of the tiara as an expression of pride and arrogance. Xenophon alludes to felted quilts manufactured in Media and spread out as couches or rugs on the ground to sit upon. The Medes also availed themselves of bags and sacks made of felt, and the Persians used felt for the trappings of their horses.

In Anglo-Indian a rug felt is styled *numda* or *numna*. This word is derived from Hindustani *namda* and Persian *namad*. These felt rugs to this day form a special product of the home industry of Khotan whence large consignments are annually exported to Ladak and Kashmir. Sir Aurel Stein (*Sand-buried Ruins of Khotan*, p. 402) has discovered the earliest mention of these felt rugs under the name *namadis* in a Kharoshthi document found in the ruins of Khotan and dated in the ninth year of King Jitroghavarshman, which relates a transaction by a certain Buddhagosha concerning some household goods pawned perhaps or taken over on mortgage. The articles are enumerated in detail, and their value is indicated. Besides sheep, vessels, wool-weaving appliances, and some other implements, this list contains also the felt rugs *namadis*.

Still more fortunate, Sir Aurel succeeded in wresting from ancient refuse heaps and buried temple-ruins of Chinese Turkestan numerous remains of

old felts, which are described in his monumental work *Serindia*. These, in all probability, are the earliest felt remains now in existence that have survived the ravages of time; they are preserved in the British Museum. They should be carefully examined and analyzed some day by a felt expert. Such a study may throw an unexpected light on the early technique of felt making and its historical associations.

Of felt pieces and fragments discovered by Sir Aurel Stein in Chinese Turkestan may particularly be mentioned a felt pad of kidney shape covered with buff silk, a conical headgear in carefully gored yellow felt shaped like a Phrygian cap, shoe-soles, a fragment with a wave-scroll pattern in thin crimson felt sewed on; fragments of felt dyed yellow, red, and scarlet; small pieces of yellow felt painted on a tempera surface with floral and geometrical designs in a variety of colors, and many others. With reference to his discovery of crimson felt it may not be amiss to call to mind the purple or scarlet felt used for draping the funeral pile of Hephaestion when this friend of Alexander the Great died at Ecbatana in 324 B.C. and was interred at Babylon with splendid obsequies by order of his master.

In his work *Ruins of Desert Cathay* Sir Aurel writes,

Kök-yar is famous throughout Turkestan for its excellent felts, and a good deal of the manifest ease prevailing in these homesteads was no doubt derived from the profits of this flourishing industry.

In the ruined fort of Miran he found a well-preserved felt pouch which might have formed part of a soldier's equipment (plate 138, fig. 27). Kök-yar is also renowned for its felt socks called *paipak*, and Karghalik is the great market for them. In another passage he says,

Clean mud walls and gaily-colored Khotan felts (*kirgiz*) make even a bare little room look cheerful and homely on a winter evening.

Another archaeological discovery of importance was made two generations ago by W. Radloff in graves of southern Siberia which belong to the Iron age. From these he brought to light a felt boot or sock, the sole of which was wrought from a very fine kind of felt. This was the product of some ancient Turkish tribe. Pointed caps appear frequently on stone monuments or on bronze plaques of southern Siberia, and these were doubtless made of felt.

Reference was made above to the ancient Hiung-nu or Huns as having dwelt under felt tents, and this type of habitation has been characteristic of most Turkish tribes in Asia through all ages. In the sixth century of our era a new Turkish nation inhabiting what is at present southern Mongolia came to the attention of the Chinese, and was called by them Tu-küe

which transcribes the very word "Turk" and which represents the first appearance of this name in history. These Tu-küe, in the same manner as their predecessors, clothed themselves in hide and wool and lived in felt tents. The Kozlov expedition in northern Mongolia, the results of which were published in 1925, found a felt carpet bordered with embroidered silk beneath the coffin in the main tomb excavated. This splendid specimen may be attributed to Hiung-nu workmanship, and is believed to date from the first century before our era. Thick felt soles embroidered with silk or thin thread were also brought to light from the same group of graves. For illustrations see *Burlington Magazine*, April, 1926.

The Kirgiz, another ancient Turkish tribe, according to the Chinese Annals, wore white felt caps, with the exception of their chief, who in the winter wore a sable hat and in the summer a pointed metal helmet with a turned-up tip. They joined pieces of felt together to make tents; the chiefs lived in small tents.

The Shi-wei, an ancient tribe of Manchuria (now extinct), although they lived in huts covered with coarse mats, had felt tents in the Turkish manner placed on carts; these were obviously used for traveling. In lieu of felt, the Chinese Annals say, they placed a package of grass under the saddles of their horses.

In electing their chieftains the Turkish tribes were accustomed to lift them on a white felt rug, not on a carpet. In ceremonial ritual the oldest customs of a tribe are purely preserved and rigidly adhered to, and it is plainly manifested by this practice that the use of felt rugs preceded that of woven rugs among the Turks. It is an interesting fact also that in the Turkish epic poems which clearly mirror a true picture of their ancient primitive life the art of weaving is never mentioned, whereas sewing, embroidery, and felting are referred to as the sole pastime and handicraft of women.

The manufacture of felt covers is the most important home industry of the Kirgiz-Kaizak in Russian Turkestan, and is almost exclusively the business of women. Felts are used by them for covering their tents (yurts), as rugs, door curtains, saddle covers, pouches, bottle cases, mittens, and mattresses. Their sale forms a significant source of income for them; for the Russians also, especially the Cossacks, and the sedentary town-population of Turkestan like the Sarts, make ample use of felt material, e. g. for window shutters, mattresses, and particularly for packing merchandise to be transported by caravan. Owing to the preponderance of felt used in a variety of ways in their equipment, the Cossacks have received from the regular troops the nickname "felt troops." The inhabitants of the towns of

Russian Turkestan also produce felt, but this article is less durable and inferior in quality to the Kirgiz felt. The town products are cheaper and even finer, softer, and smoother than the unpretentious Kirgiz felt, but the latter is ten times as strong as that of the Sarts. This point is of great interest, for it confirms my opinion that felt was originally an invention of pastoral, not sedentary peoples. The latter have merely imitated the former, and while their product is more elegant and refined in appearance, it does not rival the original in solidity and durability. The Kirgiz make white and black felt; the former is regarded as the better one. Besides felt covers the women also make felt hats from white wool for the men. The Turkmens produce from felt slings for the use of boys in killing birds.

For the making of felt the summer wool of sheep is preferred, especially the first wool of the lambs born in the spring. Oil-cake serves as size, and is mixed with the water which is sprinkled over the wool spread over a reed mat. It is first beaten with rods until the mass reaches the same level. The wool is usually arranged in two layers, a lower one of brown cheaper wool and an upper one of white wool. The mat is then rolled up as tightly as possible and tied with cords. This package is rolled to and fro over the ground, pulled along with a rope by some experienced old people, and pushed with the feet by a number of girls following it. The cords are tightened from time to time. Finally the mat is removed, the wool is rolled up again and rolled and rerolled for several hours, while water is continually sprinkled on it. The woolen layers are then spread out, dried at the sun, and the felt is ready, supple and smooth like cloth. Patterns are cut out of colored felt, laid on the felt rug and beaten into it.

Among the Turkish tribes of Central Asia the white wool is first separated from the dark one. The layers are spread out on horse skins and are beaten. They are then sprinkled with water and rolled between two reed mats until the mass is solid. First it is rolled with the hands, then continued with the feet, while six or eight women with arms akimbo shove the roll along in equal pace not unlike the movements of a dance, and songs are chanted at the same time. Patterns, if desired, are laid out in dyed wool.

Franz von Schwarz, formerly astronomer of the Tashkent Observatory, in his book *Turkestan* (1900), makes the following interesting observation:

Among the natives of Russian Turkestan the belief prevails that scorpions, phalanges, tarantulas, karakurts and snakes cannot move on felt mattresses and that consequently one is safe from their attacks by sleeping on felt covers. In how far this opinion is founded on fact I cannot say with certainty; but this much I know that I myself during my travels when as a rule I used felt covers as a padding for my

camp-bed, was never attacked by scorpions, etc., even in places which teemed with this vermin.

FELT AMONG THE MONGOLS

Marco Polo (book I, ch. 52), the Venetian traveler of the thirteenth century, writes that

the houses of the Mongols are circular and are made of wands covered with felts. These are carried along with them whithersoever they go; for the wands are so strongly bound together, and likewise so well combined, that the frame can be made very light. They also have wagons covered with black felt so efficaciously that no rain can get in. These are drawn by oxen and camels, and the women and children travel in them.

In the same manner Plano Carpini, in 1246, describes the Mongol houses as round and artificially made like tents, of rods and twigs interwoven, having a round hole in the middle of the roof for the admission of light and the passage of smoke, the whole being covered with felt, of which likewise the doors are made.

Ibn Batuta, the eminent Arabic traveler of the fourteenth century, when he betook himself to Sarai, was conveyed in a four-wheeled wagon on which he says was placed a sort of pavilion of wands laced together with narrow thongs; it was very light, covered with felt or cloth, and equipped with latticed windows, so that the traveler inside could look out without being seen; he could change his position at pleasure, sleeping or eating, reading or writing during the journey.

Some of the tents were collapsible, others were massive and stationary. On this point we are informed by Carpini as follows:

Some of the huts are speedily taken to pieces and put up again; such are packed on the beasts. Others cannot be taken to pieces, but are carried bodily on the wagons. To carry the smaller tents on a wagon a single ox may serve; for the larger ones three oxen or four, or even more, according to size.

The carts that were used to transport the valuables of the Mongols were covered with felt soaked in tallow or ewe's milk, to make them waterproof. The stilts of these carts were rectangular, in the form of a large trunk.

White felt played a significant role among the Mongols during the coronation ceremony. The king was placed on a mat of white felt which was spread on the ground. In A.D. 1206 Temuchin was crowned emperor at an assembly of the princes of Mongolia when he assumed the title Chingiz Khan. On this occasion he was seated upon a rug of white felt and was reminded of the importance of the duties to which he was called. An orator who spoke in the name of the nation addressed the new lord thus:

Direct thy eyes on the felt on which thou sitteth. If thou wilt well govern thy kingdom, thou wilt rule gloriously, and the whole world will submit to thy sway; but if thou wilt do the reverse, thou wilt be unhappy and be outcast and become so indigent that thou wilt not even have a piece of felt on which to sit.

This was not merely intended as a moral exhortation, but the ceremony was imbued with a deeper significance. Among the Mongols, even of the present time, white felt is a material endowed with a sacred character. Placing a person on a white felt rug means expressing to him good wishes for his welfare. For this reason a bride is seated on a white felt during the marriage ceremony, or people at the point of starting on a long journey receive this honor. An animal selected for a sacrifice to the gods is slaughtered on a white felt. The women therefore, in speaking of felt, carefully avoid the common word for it (*ishighei*), which is a term of respect, but substitute for it the words *dzulakhai* or *tolok*. It is on record also that the felt rug which served for the inauguration of Chingiz, dignified by the fortune of the world conqueror, was long preserved by his successors as a palladium and sacred relic.

Timur or Tamerlan (1336-1405), the formidable conqueror, is credited with the invention of a kind of felt hat for the use of his troops when he invaded Persia. These headgears guarded his soldiers more efficiently from the sun and rain than turbans, and distinguished them from their enemies.

Of all facts connected with the history of felt the most singular is that the images of their gods were fashioned by the Mongols from this material. Plano Carpini, who in the year 1246 went as ambassador to the Great Khan of the Mongols, informs us:

They have certain idols made of felt in the image of a man, and these they place on either side of the door of their dwelling; and above these they place things made of felt in the shape of teats, and these they believe to be the guardians of their flocks, and that they insure them increase of milk and colts. Whenever they begin to eat or drink, they first offer these idols a portion of their food or drink.

Friar Rubruk, who also made the wearisome journey to Mongolia, has this story to tell:

And over the head of the master is always an image of felt, like a doll or statuette, which they call the brother of the master; another similar one is above the head of the mistress, which they call the brother of the mistress, and they are attached to the wall; and higher up between the two of them is a little lank one, who is, as it were, the guardian of the whole dwelling.

Marco Polo, with reference to the god of the "Tartars," says,
They have a certain god of theirs called Natigay, and they say he is the god of the

earth, who watches over their children, cattle, and crops. They show him great worship and honor, and every man has a figure of him in his house, made of felt and cloth; and they also make in the same manner images of his wife and children. The wife they put on the left hand and the children in front. And when they eat, they take the fat of the meat and grease the god's mouth withal, as well as the mouths of his wife and children.

Friar Odoric of Pordenone, who visited northern China between 1322 and 1328, speaks of the Minor Friars as exorcising devils among the Mongols and throwing into the fire their idols which are made of felt, while all the people of the country round assemble to see their neighbors' gods burnt.

Felt gods formerly existed among the Turks also. Captain John Smith, the same who wrote *The General History of Virginia, New England and the Summer Isles*, has given a vivid description of the life of the Tartars of southern Russia in his *True Travels, Adventures, and Observations in Europe, Asia, Africa, and America, from 1593 to 1629* (London, 1630). He describes the houses of the princes as

very artificially wrought, both the foundation, sides, and roof of wickers, ascending round to the top like a dove-coat; this they cover with white felt or white earth tempered with the powder of bones, that it may shine the whiter, sometimes with black felt, curiously painted with vines, trees, birds, and beasts.

His most interesting contribution is the description of the felt gods as follows:

Having taken their houses from the carts, they place the master always towards the north; over whose head is always an image like a puppet, made of felt, which they call his brother; the women on his left hand, and over the chiefe mistris her head, such another brother; and betweene them a little one, which is the keeper of the house; at the good wives beds-feet is a kids skinne, stuffed with wooll, and neere it a puppet looking towards the maids; next the doore another, with a dried cowes udder, for the women that milke the kine, because only the men milke mares; every morning, those images in their orders they besprinkle with that they drinke, bee it cossmos [kumis] or whatsoever, but all the white mares milke is reserved for the prince. Then without the doore, thrice to the south, every one bowing his knee in honour of the fire; then the like to the east, in honour of the aire; then to the west, in honour of the water; and lastly to the north, in behalfe of the dead.

The Mongols, in making felt, wet and beat sheep's wool with sticks, then press it, and tie the rough strips of wool to grazing horses who drag them across the smooth grass surface of the plain and thus complete them.

FELT AMONG GREEKS AND ROMANS

The earliest Greek allusion to felt (Greek *pilos*) occurs in Homer's Iliad (X, 265), where it is said that Odysseus wore a hide helmet lined with felt.

Felt was used by the Greeks for cuirasses and garments, especially rain cloaks; chiefly, however, for tight-fitting caps of a conical shape to be pulled over one's ears to ward off cold or rain (Greek *pilidion*, Latin *pilleolum*). Such a cap was generally worn by artisans and sailors, and appears in artistic representations as their characteristic outfit. Hephaestus and Daedalus wear it as craftsmen; Charon and Odysseus, as seafarers. Brimmed hats also were made of felt. It is a curious coincidence that the Greek fishermen were equipped with a felt cap as their fellow-workers in China still are. In the description of a fisherman's apparatus Philippus mentions "the felt cap encompassing his head and protecting it from wet."

Boots and socks were likewise made of felt, and there is an instance on record that it was used in lieu of armor by Caesar's soldiers when they were much annoyed by Pompey's archers and in need of arrow-proof jerkins (*Bellum civile* III, 44). Thucydides refers to a similar expedient to protect the body from arrows. Even in besieging and defending cities felt was used, together with hides and sackcloth, to cover the wooden towers and military engines.

The ancients used chiefly sheep wool for making felt, more rarely the hair of goat, camel, hare, and beaver. It seems that felt was sometimes used to cover the bodies of animals. According to Aristotle, the Greeks clothed their sheep with soft wool either with skins or with pieces of felt, and the wool turned gray in consequence.

The Romans received the use of felt together with its name from the Greeks (Latin *pileus*, *pileus*, *pileum* or *pilleum*); this word, in particular, denotes the tight-fitting felt cap worn by the Romans at meals, theatrical performances, and festivals. It is a curious fact that the felt cap was among the Romans a symbol of liberty; when a slave obtained his freedom, he had his head shaved and wore the skull-cap of undyed felt. On the other hand, slaves when they were sold by their master, wore this cap as a sign that the seller would not offer any guaranty for them. The phrase *ad pileum vocare* ("to call to the felt cap") had the meaning "to call the slaves to freedom, to provoke them to rebellion through promises of freedom." At the death of Nero in A.D. 68 the common people roamed about in the streets of Rome as an expression of their joy. Suetonius, in his Life of Nero, speaks on this occasion of the "felted mob" (*plebs pileata*). In allusion to this custom the figure of Liberty on the coins of Antoninus Pius (A.D. 138-161) holds the cap in her right hand.

Pliny (VIII, 73) writes that

wool is compressed also for making felt, which when soaked in vinegar is capable of even resisting iron; and what is still more, after having gone through the last process, wool will even resist fire.

Papadopoulo-Vretos, in 1845, made this communication to the Academy of Inscriptions and Letters of Paris:

I have macerated unbleached flax in vinegar saturated with salt, and after compression have obtained a felt, with a power of resistance quite comparable with that of the famous armor of Conrad of Montferrat; seeing that neither the point of a sword, nor even balls discharged from fire-arms, were able to penetrate it.

The felting process was denoted by the verb *cogere* ("to bring together, to pile up"). A felter was called a *coactor*, *coactiliarius*, or *coactor lanarius* ("wool felter"); his art was designated *ars coactiliaria*; felt products were styled *coacta*. In an edict of the Emperor Diocletianus (A.D. 285-305) is mentioned a horse-cover of felt under the term *centunclum equestre coactile*.

The question may be raised whether the Romans transmitted the knowledge of felt to the Celtic and Germanic peoples, or in other words whether the use of felt in mediaeval and modern Europe is a heritage of classical civilization. The Germanic languages have a word for felt in common: German *filz*, Dutch *vild*, Danish-Swedish *filt*, Anglo-Saxon *felt*. This word is connected by linguists with Old Slavic *plusti*. It is noteworthy that the word for felt in the Romanic languages is not based, as might be expected, on Latin *pileus*, but on the Germanic word: Italian and Portuguese *feltro*, Spanish *fieltrro*, French *feutre* (Italian *feltrare*, French *feutrer*, "to felt"), hence mediaeval Latin *filtrum*. It is therefore probable that the Romanic nations received the knowledge of felt not from the ancient Romans, but from Germanic tribes early in the middle ages. The latter may have acquired the art from their eastern neighbors, the Slavs; and the Slavs derived their knowledge from Scytho-Siberian-Turkish peoples. The Russian word for felt, *woilok*, is a loan-word based on Turkish *oilik* ("that which serves as a cover"); the same word appears in Polish as *wojlok*.

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